

SEQUENCE LISTING

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<120> MAMMALIAN SUBTILISIN/KEXIN ISOZYME SKI-1: A PROPROTEIN  
CONVERTASE WITH A UNIQUE CLEAVAGE SPECIFICITY

<130> IRCM

<140> PCT/CA99/01058

<141> 1999-11-04

<150> CA 2,249,648

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<160> 76

<170> PatentIn Ver. 2.1

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Asp	Asn	Leu	Arg	Met	Lys	Asn	Asp	Pro	Leu	Asp	Trp	Asn	Gly	Asp	His	645	650	655
Val	His	Thr	Asn	Phe	Arg	Asp	Met	Tyr	Gln	His	Leu	Arg	Ser	Met	Gly	660	665	670

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 Gln Ser Ser Arg Pro Leu Arg Arg Ala Ser Leu Ser Leu Gly Ser Gly  
                   160                  165                  170





gat aac atc gcc cgc ttt tct tca agg gga atg act acc tgg gag cta	1636
Asp Asn Ile Ala Arg Phe Ser Ser Arg Gly Met Thr Thr Trp Glu Leu	
365 370 375 380	
cca gga ggc tac ggt cgc atg aaa cct gac att gtc acc tat ggt gct	1684
Pro Gly Gly Tyr Gly Arg Met Lys Pro Asp Ile Val Thr Tyr Gly Ala	
385 390 395	
ggc gtg cgg ggt tct ggc gtg aaa ggg ggg tgc cgg gcc ctc tca ggg	1732
Gly Val Arg Gly Ser Gly Val Lys Gly Gly Cys Arg Ala Leu Ser Gly	
400 405 410	
acc agt gtt gct tct cca gtg gtt gca ggt gct gtc acc ttg tta gtg	1780
Thr Ser Val Ala Ser Pro Val Val Ala Gly Ala Val Thr Leu Leu Val	
415 420 425	
agc aca gtc cag aag cgt gag ctg gtg aat ccc gcc agt atg aag cag	1828
Ser Thr Val Gln Lys Arg Glu Leu Val Asn Pro Ala Ser Met Lys Gln	
430 435 440	
gcc ctg atc gcg tca gcc cgg agg ctc ccc ggg gtc aac atg ttt gag	1876
Ala Leu Ile Ala Ser Ala Arg Arg Leu Pro Gly Val Asn Met Phe Glu	
445 450 455 460	
caa ggc cac ggc aag ctc gat ctg ctc aga gcc tat cag atc ctc aac	1924
Gln Gly His Gly Lys Leu Asp Leu Leu Arg Ala Tyr Gln Ile Leu Asn	
465 470 475	
agc tac aag cca cag gca agt ttg agc ccc agc tac ata gat ctg act	1972
Ser Tyr Lys Pro Gln Ala Ser Leu Ser Pro Ser Tyr Ile Asp Leu Thr	
480 485 490	
gag tgt ccc tac atg tgg ccc tac tgc tcc cag ccc atc tac tat gga	2020
Glu Cys Pro Tyr Met Trp Pro Tyr Cys Ser Gln Pro Ile Tyr Tyr Gly	
495 500 505	
gga atg ccg aca gtt gtt aat gtc acc atc ctc aac ggc atg gga gtc	2068
Gly Met Pro Thr Val Val Asn Val Thr Ile Leu Asn Gly Met Gly Val	
510 515 520	
aca gga aga att gta gat aag cct gac tgg cag ccc tat ttg cca cag	2116
Thr Gly Arg Ile Val Asp Lys Pro Asp Trp Gln Pro Tyr Leu Pro Gln	
525 530 535 540	
aac gga gac aac att gaa gtt gcc ttc tcc tac tcc tcg gtc tta tgg	2164
Asn Gly Asp Asn Ile Glu Val Ala Phe Ser Tyr Ser Ser Val Leu Trp	
545 550 555	

cct tgg tcg ggc tac ctg gcc atc tcc att tct gtg acc aag aaa gcg	2212
Pro Trp Ser Gly Tyr Leu Ala Ile Ser Ile Ser Val Thr Lys Lys Ala	
560 565 570	
gct tcc tgg gaa ggc att gct cag ggc cat gtc atg atc act gtg gct	2260
Ala Ser Trp Glu Gly Ile Ala Gln Gly His Val Met Ile Thr Val Ala	
575 580 585	
tcc cca gca gag aca gag tca aaa aat ggt gca gaa cag act tca aca	2308
Ser Pro Ala Glu Thr Glu Ser Lys Asn Gly Ala Glu Gln Thr Ser Thr	
590 595 600	
gta aag ctc ccc att aag gtg aag ata att cct act ccc ccg cga agc	2356
Val Lys Leu Pro Ile Lys Val Lys Ile Ile Pro Thr Pro Pro Arg Ser	
605 610 615 620	
aag aga gtt ctc tgg gat cag tac cac aac ctc cgc tat cca cct ggc	2404
Lys Arg Val Leu Trp Asp Gln Tyr His Asn Leu Arg Tyr Pro Pro Gly	
625 630 635	
tat ttc ccc agg gat aat tta agg atg aag aat gac cct tta gac tgg	2452
Tyr Phe Pro Arg Asp Asn Leu Arg Met Lys Asn Asp Pro Leu Asp Trp	
640 645 650	
aat ggt gat cac atc cac acc aat ttc agg gat atg tac cag cat ctg	2500
Asn Gly Asp His Ile His Thr Asn Phe Arg Asp Met Tyr Gln His Leu	
655 660 665	
aga agc atg ggc tac ttt gta gag gtc ctc ggg gcc ccc ttc acg tgt	2548
Arg Ser Met Gly Tyr Phe Val Glu Val Leu Gly Ala Pro Phe Thr Cys	
670 675 680	
ttt gat gcc agt cag tat ggc act ttg ctg atg gtg gac agt gag gag	2596
Phe Asp Ala Ser Gln Tyr Gly Thr Leu Leu Met Val Asp Ser Glu Glu	
685 690 695 700	
gag tac ttc cct gaa gag atc gcc aag ctc cgg agg gac gtg gac aac	2644
Glu Tyr Phe Pro Glu Glu Ile Ala Lys Leu Arg Arg Asp Val Asp Asn	
705 710 715	
ggc ctc tcg ctc gtc atc ttc agt gac tgg tac aac act tct gtt atg	2692
Gly Leu Ser Leu Val Ile Phe Ser Asp Trp Tyr Asn Thr Ser Val Met	
720 725 730	
aga aaa gtg aag ttt tat gat gaa aac aca agg cag tgg tgg atg ccg	2740
Arg Lys Val Lys Phe Tyr Asp Glu Asn Thr Arg Gln Trp Trp Met Pro	
735 740 745	

gat acc gga gga gct aac atc cca gct ctg aat gag ctg ctg tct gtg	2788
Asp Thr Gly Gly Ala Asn Ile Pro Ala Leu Asn Glu Leu Leu Ser Val	
750 755 760	
tggttg aac atg ggg ttc agc gat ggc ctg tat gaa ggg gag ttc acc ctg	2836
Trp Asn Met Gly Phe Ser Asp Gly Leu Tyr Glu Gly Glu Phe Thr Leu	
765 770 775 780	
gcc aac cat gac atg tat tat gcg tca ggg tgc agc atc gcg aag ttt	2884
Ala Asn His Asp Met Tyr Tyr Ala Ser Gly Cys Ser Ile Ala Lys Phe	
785 790 795	
cca gaa gat ggc gtc gtg ata aca cag act ttc aag gac caa gga ttg	2932
Pro Glu Asp Gly Val Val Ile Thr Gln Thr Phe Lys Asp Gln Gly Leu	
800 805 810	
gag gtt tta aag cag gaa aca gca gtt gtt gaa aac gtc ccc att ttg	2980
Glu Val Leu Lys Gln Glu Thr Ala Val Val Glu Asn Val Pro Ile Leu	
815 820 825	
gga ctt tat cag att cca gct gag ggt gga ggc cgg att gta ctg tat	3028
Gly Leu Tyr Gln Ile Pro Ala Glu Gly Gly Gly Arg Ile Val Leu Tyr	
830 835 840	
ggg gac tcc aat tgc ttg gat gac agt cac cga cag aag gac tgc ttt	3076
Gly Asp Ser Asn Cys Leu Asp Asp Ser His Arg Gln Lys Asp Cys Phe	
845 850 855 860	
tggttg ctt ctg gat gcc ctc ctc cag tac aca tcg tat ggg gtg aca ccg	3124
Trp Leu Leu Asp Ala Leu Leu Gln Tyr Thr Ser Tyr Gly Val Thr Pro	
865 870 875	
cct agc ctc agt cac tct ggg aac cgc cag cgc cct ccc agt gga gca	3172
Pro Ser Leu Ser His Ser Gly Asn Arg Gln Arg Pro Pro Ser Gly Ala	
880 885 890	
ggc tca gtc act cca gag agg atg gaa gga aac cat ctt cat cgg tac	3220
Gly Ser Val Thr Pro Glu Arg Met Glu Gly Asn His Leu His Arg Tyr	
895 900 905	
tcc aag gtt ctg gag gcc cat ttg gga gac cca aaa cct cgg cct cta	3268
Ser Lys Val Leu Glu Ala His Leu Gly Asp Pro Lys Pro Arg Pro Leu	
910 915 920	
cca gcc tgt cca cgc ttg tct tgg gcc aag cca cag cct tta aac gag	3316
Pro Ala Cys Pro Arg Leu Ser Trp Ala Lys Pro Gln Pro Leu Asn Glu	
925 930 935 940	

acg gcg ccc agt aac ctt tgg aaa cat cag aag cta ctc tcc att gac 3364  
 Thr Ala Pro Ser Asn Leu Trp Lys His Gln Lys Leu Leu Ser Ile Asp  
 945 950 955

ctg gac aag gtg gtg tta ccc aac ttt cga tcg aat cgc cct caa gtg 3412  
 Leu Asp Lys Val Val Leu Pro Asn Phe Arg Ser Asn Arg Pro Gln Val  
 960 965 970

agg ccc ttg tcc cct gga gag agc ggc gcc tgg gac att cct gga ggg 3460  
 Arg Pro Leu Ser Pro Gly Glu Ser Gly Ala Trp Asp Ile Pro Gly Gly  
 975 980 985

atc atg cct ggc cgc tac aac cag gag gtg ggc cag acc att cct gtc 3508  
 Ile Met Pro Gly Arg Tyr Asn Gln Glu Val Gly Gln Thr Ile Pro Val  
 990 995 1000

ttt gcc ttc ctg gga gcc atg gtg gtc ctg gcc ttc ttt gtg gta caa 3556  
 Phe Ala Phe Leu Gly Ala Met Val Val Leu Ala Phe Phe Val Val Gln  
 1005 1010 1015 1020

atc aac aag gcc aag agc agg ccg aag cgg agg aag ccc agg gtg aag 3604  
 Ile Asn Lys Ala Lys Ser Arg Pro Lys Arg Arg Lys Pro Arg Val Lys  
 1025 1030 1035

cgc ccg cag ctc atg cag cag gtt cac ccg cca aag acc cct tcg gtg 3652  
 Arg Pro Gln Leu Met Gln Gln Val His Pro Pro Lys Thr Pro Ser Val  
 1040 1045 1050

tgaccggcag cctggctgac cgtgagggcc agagagagcc ttcacggacg gcgctggtgg 3712

gtgagccgag ctgtggtggc ggctggttta aaagggatcc agtttccagc tgcaggtttg 3772

ttagagtctg ttctacatgg gcttgccttc ctgtgatggg cagaggctcc tggtagatcg 3832

agaagattcc tgtggatccc gtcaggaggg acttagtggc tctgccgcca gtgagacttc 3892

ccgccggcag ctgtgcgcac caaagactcg ggagaactgg aaaggctgtc tgggggtcttc 3952

tgactgcagg ggaaggatgt actttccaaa caaatgatac aaccctgacc aagctaaaag 4012

acgcttggtta aaggctatctt tctatatctta ttgttgggaa aagtcacttt aaagacttgt 4072

gctatttgga agcaaagcta ttttttttgt cagtggaaatg cagttttttt actattccat 4132

catgaggaac aacatagatt ccatgatctt tttaatgaca gtacagactg agatttgaag 4192

gaaacatgca caaatctgta aaacatagac cttcgcttta tttttgtaag tatcacctgc 4252

caccatgttt tgtaatttga ggtcttgatt tcaccattgt cggatgaagaa aattttcaat 4312

aaatatgtat taccggtctg aagctt 4338

<210> 6

<211> 1052

<212> PRT

<213> Homo sapiens

<400> 6

Met Lys Leu Val Asn Ile Trp Leu Leu Leu Leu Val Val Leu Leu Cys  
1 5 10 15

Gly Lys Lys His Leu Gly Asp Arg Leu Glu Lys Lys Ser Phe Glu Lys  
20 25 30

Ala Pro Cys Pro Gly Cys Ser His Leu Thr Leu Lys Val Glu Phe Ser  
35 40 45

Ser Thr Val Val Glu Tyr Glu Tyr Ile Val Ala Phe Asn Gly Tyr Phe  
50 55 60

Thr Ala Lys Ala Arg Asn Ser Phe Ile Ser Ser Ala Leu Lys Ser Ser  
65 70 75 80

Glu Val Asp Asn Trp Arg Ile Ile Pro Arg Asn Asn Pro Ser Ser Asp  
85 90 95

Tyr Pro Ser Asp Phe Glu Val Ile Gln Ile Lys Glu Lys Gln Lys Ala  
100 105 110

Gly Leu Leu Thr Leu Glu Asp His Pro Asn Ile Lys Arg Val Thr Pro  
115 120 125

Gln Arg Lys Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp Pro Thr  
130 135 140

Val Pro Cys Asn Glu Thr Arg Trp Ser Gln Lys Trp Gln Ser Ser Arg  
145 150 155 160

Pro Leu Arg Arg Ala Ser Leu Ser Leu Gly Ser Gly Phe Trp His Ala  
165 170 175

Thr Gly Arg His Ser Ser Arg Arg Leu Leu Arg Ala Ile Pro Arg Gln  
180 185 190

Val Ala Gln Thr Leu Gln Ala Asp Val Leu Trp Gln Met Gly Tyr Thr



450		455		460	
Lys Leu Asp Leu Leu Arg Ala Tyr Gln Ile Leu Asn Ser Tyr Lys Pro					
465		470		475	480
Gln Ala Ser Leu Ser Pro Ser Tyr Ile Asp Leu Thr Glu Cys Pro Tyr					
	485		490		495
Met Trp Pro Tyr Cys Ser Gln Pro Ile Tyr Tyr Gly Gly Met Pro Thr					
	500		505		510
Val Val Asn Val Thr Ile Leu Asn Gly Met Gly Val Thr Gly Arg Ile					
	515		520		525
Val Asp Lys Pro Asp Trp Gln Pro Tyr Leu Pro Gln Asn Gly Asp Asn					
	530		535		540
Ile Glu Val Ala Phe Ser Tyr Ser Ser Val Leu Trp Pro Trp Ser Gly					
545		550		555	560
Tyr Leu Ala Ile Ser Ile Ser Val Thr Lys Lys Ala Ala Ser Trp Glu					
	565		570		575
Gly Ile Ala Gln Gly His Val Met Ile Thr Val Ala Ser Pro Ala Glu					
	580		585		590
Thr Glu Ser Lys Asn Gly Ala Glu Gln Thr Ser Thr Val Lys Leu Pro					
	595		600		605
Ile Lys Val Lys Ile Ile Pro Thr Pro Pro Arg Ser Lys Arg Val Leu					
	610		615		620
Trp Asp Gln Tyr His Asn Leu Arg Tyr Pro Pro Gly Tyr Phe Pro Arg					
625		630		635	640
Asp Asn Leu Arg Met Lys Asn Asp Pro Leu Asp Trp Asn Gly Asp His					
	645		650		655
Ile His Thr Asn Phe Arg Asp Met Tyr Gln His Leu Arg Ser Met Gly					
	660		665		670
Tyr Phe Val Glu Val Leu Gly Ala Pro Phe Thr Cys Phe Asp Ala Ser					
	675		680		685
Gln Tyr Gly Thr Leu Leu Met Val Asp Ser Glu Glu Glu Tyr Phe Pro					
	690		695		700
Glu Glu Ile Ala Lys Leu Arg Arg Asp Val Asp Asn Gly Leu Ser Leu					

705		710		715		720
Val Ile Phe Ser Asp Trp Tyr Asn Thr Ser Val Met Arg Lys Val Lys						
		725		730		735
Phe Tyr Asp Glu Asn Thr Arg Gln Trp Trp Met Pro Asp Thr Gly Gly						
		740		745		750
Ala Asn Ile Pro Ala Leu Asn Glu Leu Leu Ser Val Trp Asn Met Gly						
		755		760		765
Phe Ser Asp Gly Leu Tyr Glu Gly Glu Phe Thr Leu Ala Asn His Asp						
		770		775		780
Met Tyr Tyr Ala Ser Gly Cys Ser Ile Ala Lys Phe Pro Glu Asp Gly						
		785		790		800
Val Val Ile Thr Gln Thr Phe Lys Asp Gln Gly Leu Glu Val Leu Lys						
		805		810		815
Gln Glu Thr Ala Val Val Glu Asn Val Pro Ile Leu Gly Leu Tyr Gln						
		820		825		830
Ile Pro Ala Glu Gly Gly Gly Arg Ile Val Leu Tyr Gly Asp Ser Asn						
		835		840		845
Cys Leu Asp Asp Ser His Arg Gln Lys Asp Cys Phe Trp Leu Leu Asp						
		850		855		860
Ala Leu Leu Gln Tyr Thr Ser Tyr Gly Val Thr Pro Pro Ser Leu Ser						
		865		870		875
His Ser Gly Asn Arg Gln Arg Pro Pro Ser Gly Ala Gly Ser Val Thr						
		885		890		895
Pro Glu Arg Met Glu Gly Asn His Leu His Arg Tyr Ser Lys Val Leu						
		900		905		910
Glu Ala His Leu Gly Asp Pro Lys Pro Arg Pro Leu Pro Ala Cys Pro						
		915		920		925
Arg Leu Ser Trp Ala Lys Pro Gln Pro Leu Asn Glu Thr Ala Pro Ser						
		930		935		940
Asn Leu Trp Lys His Gln Lys Leu Leu Ser Ile Asp Leu Asp Lys Val						
		945		950		955
						960
Val Leu Pro Asn Phe Arg Ser Asn Arg Pro Gln Val Arg Pro Leu Ser						



965	970	975
Pro Gly Glu Ser Gly Ala Trp Asp Ile Pro Gly Gly Ile Met Pro Gly		
980	985	990
Arg Tyr Asn Gln Glu Val Gly Gln Thr Ile Pro Val Phe Ala Phe Leu		
995	1000	1005
Gly Ala Met Val Val Leu Ala Phe Phe Val Val Gln Ile Asn Lys Ala		
1010	1015	1020
Lys Ser Arg Pro Lys Arg Arg Lys Pro Arg Val Lys Arg Pro Gln Leu		
025	1030	1035
		1040
Met Gln Gln Val His Pro Pro Lys Thr Pro Ser Val		
1045	1050	

<210> 7  
 <211> 7  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Peptide

<220>  
 <221> MOD\_RES  
 <222> (2)  
 <223> Xaa represents any amino acid.

<220>  
 <221> MOD\_RES  
 <222> (3)  
 <223> Xaa represents an alkyl or an aromatic hydrophobic amino acid.

<220>  
 <221> MOD\_RES  
 <222> (4)..(6)  
 <223> Xaa represents any amino acid.

<220>  
 <221> MOD\_RES  
 <222> (7)  
 <223> Xaa represents an acidic amino acid.

<400> 7

Arg Xaa Xaa Xaa Xaa Xaa Xaa

1

5

<210> 8

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide

<220>

<221> MOD\_RES

<222> (2)

<223> Xaa represents any amino acid.

<220>

<221> MOD\_RES

<222> (3)

<223> Xaa represents an alkyl or an aromatic hydrophobic amino acid.

<220>

<221> MOD\_RES

<222> (4)

<223> Xaa represents Lys, Leu, Phe or Thr.

<220>

<221> MOD\_RES

<222> (5)..(6)

<223> Xaa represents any amino acid.

<220>

<221> MOD\_RES

<222> (7)

<223> Xaa represents an acidic amino acid.

<400> 8

Arg Xaa Xaa Xaa Xaa Xaa Xaa

1

5

<210> 9

<211> 8

<212> PRT

<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (2)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (3)  
<223> Xaa represents an alkyl or an aromatic hydrophobic acid.

<220>  
<221> MOD\_RES  
<222> (4)..(7)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (8)  
<223> Xaa represents an acidic amino acid.

<400> 9  
Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5

<210> 10  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (2)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (3)  
<223> Xaa represents an alkyl or an aromatic hydrophobic amino acid.

<220>  
<221> MOD\_RES  
<222> (4)  
<223> Xaa represents Lys, Leu, Phe or Thr.

<220>  
<221> MOD\_RES  
<222> (5)..(7)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (8)  
<223> Xaa represents an acidic amino acid.

<400> 10  
Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5

<210> 11  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (2)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (3)  
<223> Xaa is an alkyl or an aromatic hydrophobic amino acid.

<220>  
<221> MOD\_RES  
<222> (4)..(8)  
<223> Xaa represents any amino acid.

<220>  
<221> MOD\_RES  
<222> (9)

<223> Xaa represents an acidic amino acid.

<400> 11

Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5

<210> 12

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide

<220>

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<222> (2)

<223> Xaa represents any amino acid.

<220>

<221> MOD\_RES

<222> (3)

<223> Xaa represents an alkyl or an aromatic hydrophobic amino acid.

<220>

<221> MOD\_RES

<222> (4)

<223> Xaa represents Lys, Leu, Phe or Thr.

<220>

<221> MOD\_RES

<222> (5)..(8)

<223> Xaa represents any amino acid.

<220>

<221> MOD\_RES

<222> (9)

<223> Xaa represents an acid amino acid.

<400> 12

Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5

<210> 13

<211> 11

<212> PRT  
 <213> Artificial Sequence  
  
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 <223> Description of Artificial Sequence: Peptide  
  
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 Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp  
       1                  5                  10  
  
  
 <210> 14  
 <211> 13  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: Peptide  
  
 <220>  
 <221> MOD\_RES  
 <222> (1)  
 <223> Xaa represents orthoaminobenzoic acid.  
  
 <220>  
 <221> MOD\_RES  
 <222> (13)  
 <223> Xaa represents 3-nitrotyrosine.  
  
 <400> 14  
 Xaa Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp Xaa  
       1                  5                  10  
  
  
 <210> 15  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:  
       Oligonucleotide  
  
 <220>  
 <221> modified\_base  
 <222> (3)  
 <223> i

<220>  
<221> modified\_base  
<222> (9)  
<223> i

<220>  
<221> modified\_base  
<222> (12)  
<223> i

<220>  
<221> modified\_base  
<222> (18)  
<223> i

<220>  
<221> modified\_base  
<222> (21)  
<223> i

<400> 15  
ggncayggna cnywykkngc ngg

23

<210> 16  
<211> 31  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide

<220>  
<221> modified\_base  
<222> (3)  
<223> i

<220>  
<221> modified\_base  
<222> (6)  
<223> i

<220>  
<221> modified\_base  
<222> (9)  
<223> i

<220>  
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<222> (12)  
<223> i

<220>  
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<223> i

<220>  
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<223> i

<220>  
<221> modified\_base  
<222> (21)  
<223> i

<220>  
<221> modified\_base  
<222> (24)  
<223> i

<220>  
<221> modified\_base  
<222> (29)  
<223> i

<400> 16  
ccngynacnw snggnswnge nacnswgtnc c

31

<210> 17  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (5)  
<223> Xaa represents histidine or phenylalanine.

<220>



<221> MOD\_RES  
<222> (6)  
<223> Xaa represents valine or cysteine.

<400> 17  
Gly His Gly Thr Xaa Xaa Ala Gly  
1 5

<210> 18  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (4)  
<223> Xaa represents valine or methionine.

<220>  
<221> MOD\_RES  
<222> (6)  
<223> Xaa represents threonine or serine.

<220>  
<221> MOD\_RES  
<222> (8)  
<223> Xaa represents histidine or valine.

<220>  
<221> MOD\_RES  
<222> (10)  
<223> Xaa represents alanine or threonine.

<400> 18  
Gly Thr Ser Xaa Ala Xaa Pro Xaa Val Xaa Gly  
1 5 10

<210> 19  
<211> 28  
<212> DNA  
<213> Homo sapiens

<400> 19

ggatccgaag aaacatctgg gcgacaga

28

<210> 20

<211> 24

<212> DNA

<213> Homo sapiens

<400> 20

ctcgagggct ctcagccgtg tgct

24

<210> 21

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 21

gaggaagaga cagggataaa c

21

<210> 22

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 22

gggatatgct tagcattgac

20

<210> 23

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 23

agccctatta cctgaacctg

20

<210> 24

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 24

gaatctgaaa gaactccccc

20

<210> 25

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 25

ttccgagatt ccatcctacg

20

<210> 26

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 26

tgcagctcag caggtctatg

20

<210> 27

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 27

tctcctccaa cctcaaccac

20

<210> 28

<211> 22

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 28

ccagcctgtc atcctcaata tc

22

<210> 29

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 29

ggagccatgg attgcacttt c

21

<210> 30

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide

<400> 30

aggagctcaa tgtggcagga

20

<210> 31

<211> 27

<212> DNA

<213> Homo sapiens

<400> 31

gtgaccatga agcttgtcaa catctgg

27

<210> 32

<211> 26

<212> DNA

<213> Homo sapiens

<400> 32

acactggtcc ctgagagggc ccggca

26

<210> 33

<211> 21

<212> DNA

<213> Homo sapiens

<400> 33

attgacctgg acaaggtggt g

21

<210> 34

<211> 57

<212> DNA

<213> Homo sapiens

<400> 34

ggatcctcta gatcagtggt ggtggtggtg gtggtgctcc tggttgtagc ggccagg

57

<210> 35

<211> 24

<212> DNA

<213> Homo sapiens

<400> 35

ctcgagggag aggctggctc ttcg

24

<210> 36

<211> 28

<212> DNA

<213> Homo sapiens

<400> 36  
ctcgagtgtc tgggcaacct ggcgcggg

28

<210> 37  
<211> 14  
<212> PRT  
<213> Homo sapiens

<400> 37  
Lys Ala Gly Ser Arg Gly Leu Thr Ser Leu Ala Asp Thr Phe  
1 5 10

<210> 38  
<211> 27  
<212> PRT  
<213> Homo sapiens

<400> 38  
Gly Gly Ala His Asp Ser Asp Gln His Pro His Ser Gly Ser Gly Arg  
1 5 10 15

Ser Val Leu Ser Phe Glu Ser Gly Ser Gly Gly  
20 25

<210> 39  
<211> 18  
<212> PRT  
<213> Homo sapiens

<400> 39  
Trp His Ala Thr Gly Arg His Ser Ser Arg Arg Leu Leu Arg Ala Ile  
1 5 10 15

Pro Arg

<210> 40  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<400> 40

Trp His Ala Thr Gly Arg His Ser Ser Arg Arg Leu Leu Arg Ala Leu  
1 5 10 15

Glu

<210> 41

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide

<400> 41

Ser Arg Arg Leu Leu Arg Ala Leu Glu  
1 5

<210> 42

<211> 17

<212> PRT

<213> Homo sapiens

<400> 42

Trp Gln Ser Ser Arg Pro Leu Arg Arg Ala Ser Leu Ser Leu Gly Ser  
1 5 10 15

Gly

<210> 43

<211> 15

<212> PRT

<213> Homo sapiens

<400> 43

Arg Ala Ile Pro Arg Gln Val Ala Gln Thr Leu Gln Ala Asp Val  
1 5 10 15

<210> 44

<211> 9

<212> PRT

<213> Homo sapiens

<400> 44

Pro Gln Arg Lys Val Phe Arg Ser Leu

1

5

<210> 45

<211> 15

<212> PRT

<213> Homo sapiens

<400> 45

Pro Gln Arg Lys Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp

1

5

10

15

<210> 46

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<221> MOD\_RES

<222> (1)

<223> Xaa represents orthoaminobenzoic acid.

<220>

<221> MOD\_RES

<222> (13)

<223> Xaa represents 3-nitrotyrosine.

<220>

<223> Description of Artificial Sequence: Peptide

<400> 46

Xaa Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp Xaa Ala

1

5

10

<210> 47

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<221> MOD\_RES

<222> (1)

<223> Xaa represents orthoaminobenzoic acid.



<220>

<221> MOD\_RES

<222> (11)

<223> Xaa represent 3-nitrotyrosine.

<220>

<223> Description of Artificial Sequence: Peptide

<400> 47

Xaa Arg Ser Leu Lys Tyr Ala Glu Ser Asp Xaa Ala  
1 5 10

<210> 48

<211> 16

<212> PRT

<213> Homo sapiens

<400> 48

Lys Ala Gly Ser Arg Gly Leu Thr Ser Leu Ala Asp Thr Phe Glu His  
1 5 10 15

<210> 49

<211> 16

<212> PRT

<213> Rattus sp.

<400> 49

Lys Ala Gly Ser Arg Gly Leu Thr Thr Thr Ser Leu Ala Asp Thr Phe  
1 5 10 15

<210> 50

<211> 16

<212> PRT

<213> Homo sapiens

<400> 50

Arg His Ser Ser Arg Arg Leu Leu Arg Ala Ile Pro Arg Gln Val Ala  
1 5 10 15

<210> 51

<211> 16

<212> PRT

<213> Homo sapiens

<400> 51

Arg Lys Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp Pro Thr Val  
1 5 10 15

<210> 52

<211> 16

<212> PRT

<213> Homo sapiens

<400> 52

Thr Pro Gln Arg Lys Val Phe Arg Ser Leu Lys Tyr Ala Glu Ser Asp  
1 5 10 15

<210> 53

<211> 16

<212> PRT

<213> Homo sapiens

<400> 53

Val Thr Pro Gln Arg Lys Val Phe Arg Ser Leu Lys Lys Tyr Ala Glu  
1 5 10 15

<210> 54

<211> 16

<212> PRT

<213> Homo sapiens

<400> 54

Ser Gly Ser Gly Arg Ser Val Leu Ser Phe Glu Ser Gly Ser Gly Gly  
1 5 10 15

<210> 55

<211> 16

<212> PRT

<213> Homo sapiens

<400> 55

His Ser Pro Gly Arg Asn Val Leu Gly Thr Glu Ser Arg Asp Gly Pro  
1 5 10 15

<210> 56

<211> 16

<212> PRT  
<213> Rattus sp.

<400> 56  
Ala Ser Val Gly Arg Leu Ala Leu Ser Gln Glu Glu Pro Ala Pro Leu  
1 5 10 15

<210> 57  
<211> 16  
<212> PRT  
<213> Homo sapiens

<400> 57  
Arg Ile Ser Asp Arg Asp Tyr Met Gly Trp Met Asp Phe Gly Arg Arg  
1 5 10 15

<210> 58  
<211> 16  
<212> PRT  
<213> Rattus sp.

<400> 58  
Asp Pro Arg Leu Arg Gln Phe Leu Gln Lys Ser Leu Ala Ala Ala Thr  
1 5 10 15

<210> 59  
<211> 16  
<212> PRT  
<213> Bovis sp.

<400> 59  
Leu Leu Lys Glu Leu Gln Asp Leu Ala Leu Gln Gly Ala Lys Glu Arg  
1 5 10 15

<210> 60  
<211> 16  
<212> PRT  
<213> Bovis sp.

<400> 60  
Met Ala Arg Ala Pro Gln Val Leu Phe Arg Gly Gly Lys Ser Gly Glu  
1 5 10 15

<210> 61  
<211> 16  
<212> PRT  
<213> Bovis sp.

<400> 61  
Glu Leu Glu Asn Leu Ala Ala Met Asp Leu Glu Leu Gln Lys Ile Ala  
1 5 10 15

<210> 62  
<211> 16  
<212> PRT  
<213> Bovis sp.

<400> 62  
Ala Ala Met Asp Leu Glu Leu Gln Lys Ile Ala Glu Lys Phe Ser Gly  
1 5 10 15

<210> 63  
<211> 16  
<212> PRT  
<213> Rattus sp.

<400> 63  
Lys Ser Ser Phe Thr Asn Val Thr Ser Pro Val Val Leu Thr Asn Tyr  
1 5 10 15

<210> 64  
<211> 16  
<212> PRT  
<213> Rattus sp.

<400> 64  
Lys Ser Gln Thr Pro Leu Val Thr Leu Phe Lys Asn Ala Ile Ile Lys  
1 5 10 15

<210> 65  
<211> 16  
<212> PRT  
<213> Rattus sp.

<400> 65  
Ser Gln Thr Pro Leu Val Thr Leu Phe Lys Asn Ala Ile Ile Lys Asn  
1 5 10 15

<210> 66  
<211> 16  
<212> PRT  
<213> Rattus sp.

<400> 66  
Gly Pro Ala Arg Glu Leu Leu Leu Arg Leu Val Gln Leu Ala Gly Thr  
1 5 10 15

<210> 67  
<211> 16  
<212> PRT  
<213> Homo sapiens

<400> 67  
Leu Leu Arg Lys Lys Arg Thr Thr Ser Ala Glu Lys Asn Thr Cys Gln  
1 5 10 15

<210> 68  
<211> 16  
<212> PRT  
<213> Homo sapiens

<400> 68  
Glu Glu Ile Ser Glu Val Lys Met Asp Ala Glu Phe Arg His Asp Ser  
1 5 10 15

<210> 69  
<211> 16  
<212> PRT  
<213> Homo sapiens

<400> 69  
Glu Glu Ile Ser Glu Val Asn Leu Asp Ala Glu Phe Arg His Asp Ser  
1 5 10 15

<210> 70  
<211> 16  
<212> PRT  
<213> Homo sapiens

<400> 70

Ile Ser Glu Val Lys Met Asp Ala Glu Phe Arg His Asp Ser Gly Tyr  
 1 5 10 15

<210> 71  
 <211> 16  
 <212> PRT  
 <213> Homo sapiens

<400> 71  
 Glu Phe Arg His Asp Ser Gly Tyr Glu Val His His Gln Lys Leu Val  
 1 5 10 15

<210> 72  
 <211> 10  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Peptide

<400> 72  
 Ser Ser Arg Arg Leu Leu Arg Ala Ile Glu  
 1 5 10

<210> 73  
 <211> 12  
 <212> PRT  
 <213> Homo sapiens

<400> 73  
 Ser Gly Ser Gly Arg Ser Val Leu Ser Phe Glu Ser  
 1 5 10

<210> 74  
 <211> 14  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <221> MOD\_RES  
 <222> (1)  
 <223> Xaa represents orthoaminobenzoic acid.

<220>

<221> MOD\_RES  
<222> (13)  
<223> Xaa represents 3-nitrotyrosine.

<220>  
<223> Description of Artificial Sequence: Peptide

<400> 74  
Xaa Arg His Ser Ser Arg Arg Leu Leu Arg Ala Ile Xaa Ala  
1 5 10

<210> 75  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide

<220>  
<221> MOD\_RES  
<222> (1)  
<223> Xaa represents orthoaminobenzoic acid.

<220>  
<221> MOD\_RES  
<222> (11)  
<223> Xaa represents 3-nitrotyrosine.

<400> 75  
Xaa Ser Arg Arg Leu Leu Arg Ala Leu Glu Xaa Ala  
1 5 10

<210> 76  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> MOD\_RES  
<222> (1)  
<223> Xaa represents orthoaminobenzoic acid.

<220>  
<221> MOD\_RES  
<222> (14)

<223> Xaa represents 3-nitrotyrosine.

<220>

<223> Description of Artificial Sequence: Peptide

<400> 76

Xaa	Asn	Gly	Pro	Lys	Ala	Gly	Ser	Arg	Gly	Leu	Thr	Ser	Xaa	Ala
1				5					10					15